

Claims

1. A method for increasing the level of 4-desmethyl sterols in a plant which comprises increasing the enzymatic demethylation of 4-monomethyl and 4,4-dimethyl sterols.
2. A method as claimed in Claim 1, wherein the levels of 4-monomethyl sterols and 4,4-dimethyl sterols in the plant are reduced.
3. A method as claimed in Claim 1 or Claim 2, wherein the plant has been modified to increase the production of 4-monomethyl and/or 4,4-dimethyl sterols compared to the wild type plant.
4. A method as claimed in Claim 3, wherein the plant has increased HMGR activity compared to the wild type plant.
5. A method as claimed in Claim 3 or Claim 4, wherein the plant has increased SMT1 activity compared to the wild type plant.
6. A method as claimed in any one of Claims 1 to 5, wherein the 4-desmethyl sterols are selected from betasitosterol, sitostanol, stigmasterol, brassicasterol, campestanol, isofucosterol, campesterol, episterol and mixtures thereof.
7. A method as claimed in any one of Claims 1 to 6, wherein the enzymatic demethylation is increased by increasing the activity of C4SMO in the plant.

8. A method as claimed in Claim 7 wherein the activity of C4SMO in the plant is increased by increased expression of a gene coding for C4SMO.

9. A method as claimed in Claim 8 wherein the gene is a heterologous gene.

10. A method as claimed in Claim 9 wherein the gene coding for C4SMO is derived from *Arabidopsis*.

11. A method as claimed in any one of Claims 1 to 10 wherein the plant is tobacco, canola, sunflower, rape or soy.

12. A plant having increased levels of 4-desmethyl sterols compared to the wild type plant in which the levels are increased according to the method of any one of Claims 1 to 11.

13. A plant as claimed in Claim 12 which has an increased proportion of 4-desmethyl sterols relative to 4-monomethyl and 4,4-dimethyl sterols compared to the wild type plant.

14. A method of transforming a plant which comprises:

(a) transforming a plant cell with a recombinant DNA construct comprising a DNA segment encoding a polypeptide with C4SMO activity and a promoter for driving expression of said polypeptide in said plant cell, to form a transformed plant cell;

(b) regenerating the transformed plant cell into a transgenic plant; and

(c) selecting transgenic plants that have enhanced levels of 4-desmethyl sterols compared to wild type strains of the same plant.

15. A method as claimed in Claim 14, wherein the enhanced levels of 4-desmethyl sterols are in the seeds of the plant.
16. A method as claimed in Claim 14 or Claim 15 wherein the transformed plant is a plant according to Claim 12 or Claim 13.
17. A process for producing an oil comprising a 4-desmethyl sterol which comprises extracting sterols from a plant according to Claim 12 or Claim 13.
18. A process as claimed in Claim 17 in which the oil is extracted from the seeds of the plant.
19. A process as claimed in Claim 18 in which the seeds are obtained by cultivating the plant for one or more generations and harvesting the seeds.
20. Plant material obtainable from a plant according to Claim 12 or Claim 13.
21. Plant material as claimed in Claim 20 which is a seed.
22. Product comprising an oil produced by a process according to any one of Claims 17 to 19.

23. Product as claimed in Claim 22 which is a food product, an oil for use in food preparation, a lubricating oil, a fuel oil or a feedstock for use in the production of hydrocarbons.
24. The use of a gene expressing a C4SMO to increase the level of sterols in a plant.
25. The use of Claim 22 in a method of any one of Claims 1 to 11.